

REMARKS / ARGUMENTS

Disposition of the Claims

The present response is intended to be a full and complete response to the Office Action mailed July 29, 2009. Claims 17, 20 to 22, 24 to 28 and 30 to 32 are pending in the present application. The pending claims stand rejected over the prior art in the present Office Action. Applicants respectfully request continued examination and allowance of all pending claims.

Amendments to the Claims

Claim 31 has been amended to clarify that the one or a plurality of infrared radiation absorbing gases are selected from the group consisting of saturated hydrocarbons, unsaturated hydrocarbons, CO₂, CO, H₂O, NH₃, NO, N₂O, NO₂ and mixtures thereof.

Clarification of Examiner's Comments on Withdrawal of Previous Rejections

On page 2 of the present Office Action, the Examiner states that the rejections of claims 17, 22, 24, 30 and 31 in view of Stratton, WO 02/44430 and claim 25 in view of Stratton, WO 02/44430 have been withdrawn in view of the amendments by Applicants, the newly found reference and the new grounds of rejection. However, on page 4 of the same Office Action, the Examiner rejects claims 17, 21 to 22, 24 to 25 and 30 to 32 under 35 U.S.C. § 103(a) as being unpatentable over Stratton, WO 02/44430 (citing the corresponding U.S. Patent No. 7,147,732). Since U.S. Patent No. 7,147,732 is the corresponding patent to WO 02/44430, U.S. Patent No. 7,147,732 appears to be extremely similar, if not the same, in content as WO 02/44430, and the Examiner indicates that there is a newly found reference, Applicants request clarification to make certain that the new reference to which the Examiner refers is in fact U.S. Patent No. 7,147,732. Applicants further note that the other rejections within the present Office Action do not cite any additional new art from what was cited in the previous Office Action. In order to advance prosecution of the present application, Applicants will address the rejections based on U.S. Patent No. 7,147,732 and accordingly provide the following response to this Office Action.

First 35 U.S.C. § 103(a) Rejection

The Examiner rejects claims 17, 21 to 22, 24 to 25 and 30 to 32 under 35 U.S.C. § 103(a) as being unpatentable over Stratton et al., US Patent No. 7,147,732 (hereinafter "Stratton '732"). This rejection is respectfully traversed with regard to claims 17, 21 to 22, 24 to 25 and 30 to 32, as amended.

Applicants maintain that claims 17, 21 to 22, 24 to 25 and 30 to 32, as amended, are patentable over Stratton '732 since Stratton '732 teaches against the present invention -- Stratton '732 teaches that the quenching composition used in the method of Stratton '732 requires nitrogen.

Stratton '732 teaches a method of quenching a hot metal object using a hot gas stream comprising at least 20% by volume of hydrogen. In addition, the hot gas may contain from 40 to 60% by volume of nitrogen, from 12 to 20% by volume of carbon monoxide, with smaller amounts of other gases such as methane, water vapour, and carbon dioxide typically also being present." Accordingly, Stratton '732 teaches mixtures of hydrogen, nitrogen, and carbon monoxide with small amounts of methane, water vapour and carbon dioxide.

Claim 30 of the present invention provides a method for rapidly cooling metal parts using a pressurized cooling gas mixture that includes one or a plurality of gases selected from the group consisting of saturated hydrocarbons, unsaturated hydrocarbons, CO₂, CO, H₂O, NH₃, NO, N₂O, NO₂ and mixtures thereof and optionally an additive gas selected from the group consisting of hydrogen, helium and mixtures thereof. Claim 31 provides a method for rapidly cooling metal parts using a pressurized cooling gas mixture that comprises from about 5% to about 80% by volume of one or a plurality of gases selected from the group consisting of saturated hydrocarbons, unsaturated hydrocarbons, CO₂, CO, H₂O, NH₃, NO, N₂O, NO₂ and mixtures thereof and optionally an additive gas that comprises at least one member selected from the group consisting of helium, hydrogen and mixtures thereof.

The methods of the present invention utilize a cooling gas mixture that must contain one or more of saturated hydrocarbons, unsaturated hydrocarbons, CO₂, CO, H₂O, NH₃, NO, N₂O, NO₂. Unlike Stratton '732, the actual use of hydrogen in the mixture of the present invention is optional. Stratton '732 teaches mixtures that comprise hydrogen, nitrogen and carbon monoxide. While the present invention utilizes hydrogen and carbon monoxide, neither of the methods of the present invention include nitrogen which is required for the mixtures of Stratton '732.

The mixture of Stratton '732 requires the inclusion of nitrogen for quenching. As noted above, the present invention does not require nitrogen (use of the language "selected from the group consisting of"). In fact, it is noted in the background of the present invention that "the gas most commonly used for cooling is nitrogen, because it is an inert and inexpensive gas". The background goes on to provide that "it is known, in gas hardening systems, that the temperature must be lowered as rapidly as possible for the steel transformation to occur satisfactorily, from the austenitic phase to the martensitic phase without passing through the pearlitic and/or bainitic phases...[h]owever, it has been observed that in certain critical cases, nitrogen quench hardening installations are not suitable for obtaining a sufficient temperature lowering rate." Accordingly, for these reasons, the present methods do not include nitrogen.

Applicants maintain that Stratton '732 actually teaches away from the present invention since Stratton '732 teaches that nitrogen should be used in the solution utilized for quenching a hot metal object. Applicants maintain that Stratton '732 is simply another example of a document that uses an endothermic gas or a recycled carburizing gas as a quenching gas.

As the mixtures of Stratton '732 require nitrogen and the present invention does not utilize nitrogen, Applicants maintain that claims 17, 21 to 22, 24 to 25 and 30 to 32, as

amended, are not rendered obvious by Stratton '732. Accordingly, Applicants respectfully request that the rejection of these claims under 35 U.S.C. § 103(a) as being unpatentable over Stratton '732 be withdrawn.

Second 35 U.S.C. § 103(a) Rejection

The Examiner rejects claim 20 under 35 U.S.C. § 103(a) as being unpatentable over Stratton in view of Nakamura, JP Patent No. 63149313 (hereinafter "Nakamura"). This rejection is respectfully traversed.

Claim 20 depends upon claim 30. Accordingly, the same arguments made with regard to claim 30 are applicable to the rejection of claim 20. The secondary reference cited by the Examiner, Nakamura, does not overcome the deficiencies of Stratton '732. Accordingly, Applicants maintain that claim 20 is patentable over Stratton '732 in view of Nakamura. Accordingly, Applicants respectfully request that the rejection of this claim under 35 U.S.C. § 103(a) as being unpatentable over Stratton '732 in view of Nakamura be withdrawn.

Third 35 U.S.C. § 103(a) Rejection

The Examiner rejects claims 26 and 27 under 35 U.S.C. § 103(a) as being unpatentable over Stratton in view of Wandke, EP Patent No. 0869189 (hereinafter "Wandke"). This rejection is respectfully traversed.

Claims 26 and 27 depend upon claim 30. Accordingly, the same arguments made with regard to claim 30 are applicable to the rejection of claims 26 and 27. The secondary reference cited by the Examiner, Wandke, does not overcome the deficiencies of Stratton '732. Accordingly, Applicants maintain that claims 26 and 27 are patentable over Stratton '732 in view of Wandke. Accordingly, Applicants respectfully request that the rejection of these claims under 35 U.S.C. § 103(a) as being unpatentable over Stratton '732 in view of Wandke be withdrawn.

Fourth 35 U.S.C. § 103(a) Rejection

The Examiner rejects claim 28 under 35 U.S.C. § 103(a) as being unpatentable over Stratton in view of Andersson, U.S. Patent No. 5,938,866 (hereinafter “Andersson”). This rejection is respectfully traversed.

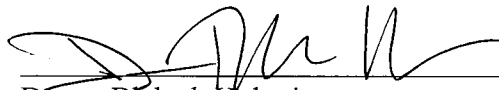
Claim 28 depends upon claim 30. Accordingly, the same arguments made with regard to claim 30 are applicable to the rejection of claim 28. The secondary reference cited by the Examiner, Andersson, does not overcome the deficiencies of Stratton ‘732. Accordingly, Applicants maintain that claim 28 is patentable over Stratton ‘732 in view of Andersson. Accordingly, Applicants respectfully request that the rejection of this claim under 35 U.S.C. § 103(a) as being unpatentable over Stratton ‘732 in view of Andersson be withdrawn.

CONCLUSION

In view of the above, Applicants maintain that the pending claims are now in condition for allowance. Early notice to this effect is earnestly solicited. Should the Examiner believe a telephone call would expedite the prosecution of the present application, the Examiner is invited to call the undersigned attorney at the number listed below.

Applicants do not believe that any fee other than the one month extension fee noted on page one of this response is due at this time. However, in the event that any additional fees are due, the Commissioner is authorized to debit deposit account number 01-1375 for the amount due.

Respectfully submitted,



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